DOCUMENT MODIFICATION REQUEST (DMR)

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Print or **Type** All Information (Except Signatures)

1. Date	25.
5/5/94	DMR. No. 94-DMR- 000995

2. Existing Document Number/Revision	3. New Document Number or Document Number if it is to be changed with this Revision
5-21000-OPS-GT.2/Rev.2	N/A

4. Originator's Name/Phone/Page/Location	5. Document Title
D. Yashan/3692/D1388/7893A	Drilling and Sampling Using Hollow-Stem Auger Techniques

6. Document Type ☒ Procedure ☐ Other _____

7. Document Modification Type (Check only one)
☐ New ☐ Revision ☒ Intent Change ☐ Nonintent Change ☐ Editorial Correction ☐ Cancellation

8. Item	9. Page	10. Step	11. Proposed Modifications
			LIMITED SCOPE: This DMR is limited to the Dam Upgrades Project.
1	4 of 16	Section 5.0	Change the 4th sentence of the 2nd paragraph to read: "Visual logging will be done in conformance with generally accepted geotechnical practice (ASTM visual soil classification techniques)."
2	4 of 16	Section 5.0	Delete the 6th sentence of the 2nd paragraph.
3	4 6 of 16	Section 5.1	Delete bullets 2, 3, 6, 7, 9, 10, 12, 13, 14, 15, 17; and modify bullet 19 to "water"; modify bullet 20 to "Drums for containment of cuttings, if necessary".
4	5 RR 5/20/94 of 16	Section 5.2	Delete the 3rd sentence of the 1st paragraph.
5	7 of 16	Section 5.2	Delete paragraph beginning "For borings where environmental samples...".
6	7 of 16	Section 5.2	After 2nd sentence of paragraph beginning " It is anticipated...", insert the following: "If during geotechnical drilling, bedrock is encountered that is sufficiently cemented to be resistant to auger or drive sampler penetration and sufficient samples of the bedrock have been obtained, refusal will be declared and operations (abandonment of the hole or installation of monitoring devices in the hole) will proceed when total depth has been reached."

12. Justification (Reason for Modification, EJO#, TP#, etc.)

All items changed, deleted, or added were not originally relevant to geotechnical investigation drilling.

If modification is for a new procedure or a revision, list concurring disciplines in Block 13, and enter N/A in Blocks 14 and 15. If modification is for any type of change or a cancellation, organizations are listed in Block 13, then Concurror prints, and signs in Block 14, and dates in Block 15.

13. Organization	14. Print and Sign (if applicable)	15. Date (if applicable)
SME	Tim Lovseth Robert Smith for T. Lovseth	5/24/94
EQS	Mark Brooks (RR) Mark C. Brooks	5-24-94

16. Originator's Supervisor (print/sign/date)
S. Marshall N Brown for J.A. Marshall

17. Assigned SME/Phone/Page/Location	18. Cost Center	19. Charge Number	20. Requested Completion Date	21. Effective Date
Tim Lovseth/8706/5134/080-644	0202	ENV-GT	5/23/94	RR 06/01/94

22. Accelerated Review?	23. ORC Review
Yes ☐ No ■	ORC Review Not Required; This Nonintent Change is being processed as an Intent Change to expedite the DMR process.

24. Responsible Manager (print, sign, date)
Steve Singer Stephen H. Singer 5/24/94

REVIEWED FOR CLASSIFICATION/UCNI
BY NA
DATE NA

DOCUMENT CLASSIFICATION REVIEW WAIVER
PER R.B. HOFFMAN, CLASSIFICATION OFFICE
JUNE 11, 1991

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25.
DMR. No. 94-DMR-00095 -R20/P

2. or 3. Document Number/Revision	3. Document Title
5-21000-OPS, GT.2, Rev. 2	Drilling and Sampling Using Hollow-Stem Auger Techniques

8. Item	9. Page	10. Step	11. Proposed Modifications
7	8 of 16	Section 5.2	Add at the end of the last sentence of the paragraph beginning "The borings will be logged...": "during environmental sampling. Material classification and borehole logging during geotechnical drilling will conform with generally accepted geotechnical practice (ASTM visual soil classification techniques)."
8	8 of 16	Section 5.2	Change the 3rd sentence of the 1st paragraph to read: "Therefore, water levels will be measured each day at the beginning of drilling and recorded on the appropriate forms."
9	8 of 16	Section 5.2	Change the last sentence of the 1st paragraph to read: "During drilling and removal of augers, the disposition of soil cuttings will be determined in accordance with SOP FO.23, Management of Soil and Sediment Investigation Derived Materials (IDM)."
10	8-9 of 16	Section 5.3.1	Delete entire section; renumber subsequent sections, as appropriate.
11	11 of 16	Section 5.3.3	Delete entire section; renumber subsequent sections, as appropriate.
12	11D of 16	Section 5.4	In the first sentence, after "...completed as a monitoring well" add: ", piezometer, or inclinometer".
13	12-13 of 16	Section 6.0	Replace section with "Soil samples will be obtained in accordance with generally accepted geotechnical practice and applicable ASTM standards." Also, change section heading to "Quality Assurance/Quality Control of Soil Samples".
14	13 of 16	Section 7.0	Delete first bullet paragraph. Delete first sentence of second bullet paragraph. Add a bullet paragraph that reads: "Upon completion of drilling in a work area (for this project, a dam site), all downhole equipment will be decontaminated in accordance with SOP FO.04, Heavy Equipment Decontamination."
15	14 of 16	Section 8.0	Change the first sentence to read: "...will be documented on job-specific log forms and..."

12. Justification (Reason for Modification, EJO#, TP#, etc.)

All items changed, deleted, or added were not originally relevant to geotechnical investigation drilling.

EG&G ROCKY FLATS PLANT	**Manual:**	**5-21000-OPS**
EMD MANUAL OPERATION SOP	**Procedure No.:**	**GT.2, Rev. 2**
	Page:	**1 of 16**
	Effective Date:	**06/01/94**
Category 2	**Organization:**	**Environmental Management**

TITLE:
DRILLING AND SAMPLING USING
HOLLOW-STEM AUGER TECHNIQUES

Approved By:

/s/ J.E. Evered (Name of Approver) 05/12/92 (Date)

1.0 TABLE OF CONTENTS

94-DMR-000995

94-DMR-000995

EG&G ROCKY FLATS PLANT	**Manual:**	**5-21000-OPS**
EMD MANUAL OPERATION SOP	**Procedure No.:**	**GT.2, Rev. 2**
	Page:	**1A of 16**
	Effective Date:	**06/01/94**
Category 2	**Organization:**	**Environmental Management**

LIST OF EFFECTIVE PAGES

Pages	Effective Date	Change Number
1	07/27/92	DCN 92.03
1	05/27/93	DCN 93.03
2	03/28/94	94-DMR-000382
3	01/10/94	93-DMR-000955
3A	03/28/94	94-DMR-000382
4-15	06/01/94	94-DMR-000995
8-9	03/28/94	94-DMR-000405
11	08/20/93	DCN 93.04
11	01/25/93	DCN 93.01
11A	07/27/92	DCN 92.03
11A	12/04/92	DCN 92.05
11A-C	03/17/93	DCN 93.02
12	01/10/94	93-DMR-000960
12-12A	03/28/94	94-DMR-000382
14	01/10/94	93-DMR-000955
14A	01/10/94	93-DMR-000955
Form GT.2A	01/10/94	93-DMR-000955

TOTAL NUMBER OF PAGES (including forms): 24

consist of sections of steel tubing (up to 5 feet long) with steel helical flights around the outside. Segments of auger are added as the borehole advances, and samples are retrieved through the inside of the auger without having to remove the auger from the borehole during sampling.

With this technique, samples will be obtained either with standard split spoon or California drive samplers, or with a continuous core augering technique. The continuous coring technique can obtain up to 5-foot-long cores in a 5-foot-long sample barrel; however, at RFP, sampling will be conducted in increments of 2 feet to enhance sample recovery unless otherwise specified in the Field Sampling Plan (FSP). Drive sampling will normally obtain a 12- to 18-inch-long sample depending on the length of the sampler. Visual logging will be done in conformance with generally accepted geotechnical practice (ASTM visual soil classification techniques). Sampling for chemical analysis is addressed in this SOP. ~~All sampling equipment will be protected from the ground surface with clear plastic sheeting.~~ All drilling and sampling activities will be conducted in accordance with the project Health and Safety Plan.

5.1 EQUIPMENT AND MATERIALS

The following equipment and materials are needed for hollow-stem auger drilling and soil sampling. Only the types of samplers required by the sampling specified in the Field Sampling Plan (FSP) will be required on a given project. Sample barrels will have permanent (welded or stamped) identification numbers on them.

- Drill rig equipped for drilling and sampling with hollow-stem augers
- ~~Continuous core augering equipment (including 2-1/2- to 3-inch inside diameter sample barrel suitable for 2-foot sample rods)~~
- ~~Standard split spoon sampler (ASTM D 1586)~~

- California spoon sampler
- Brass (or stainless steel) California liners (2-inch-diameter)
- ~~3 inch long stainless steel volatile/semi-volatile organic analysis (VOA) sample liner for continuous auger core barrel~~
- ~~Teflon® film (cut in 4 inch x 4 inch squares)~~
- Plastic caps for California and VOA liners
- ~~Stainless steel mixing bowl and utensils~~
- ~~Self adhesive labels~~
- Ice chests (sample shuttles)
- ~~High pressure steamer/sprayer~~
- ~~Long handled bristle brushes~~
- ~~Wash/rinse tubs~~
- ~~Phosphate free, lab grade detergent (e.g., Liquinox)~~
- Location map
- ~~Weighted tape measure~~

94-DMR-000995

94-DMR-000995

94-DMR-000995

94-DMR-000995

94-DMR-000995

- Water level probe
- ~~Distilled~~ water
- Drums for containment of cuttings, if necessary
- Appropriate health and safety equipment
- Field book
- Boring log forms

5.2 DRILLING PROCEDURES

94-DMR-000995

Boreholes will be drilled by using hollow-stem augers and the sampling equipment required by the FSP. All drilling equipment, including the rig, water tanks, augers, drill rods, samplers, etc., will be decontaminated before arrival at the work area site. ~~Between boreholes, all down hole equipment will be decontaminated, and sampling equipment will be decontaminated between samples.~~ Equipment will be inspected for evidence of fuel oil or hydraulic system leaks (see SOP FO.3, General Equipment Decontamination, and SOP FO.4, Heavy Equipment Decontamination). If lubricants are required for downhole equipment, only pure vegetable oil will be used.

Before drilling, borings will have been located, numbered, and identified using stakes or paint sticks on paved surfaces. Buried metal objects will have been located by using geophysical methods, and utility clearance will have been accomplished according to SOP GT.10, Borehole Clearing.

After boreholes have been cleared and obstructions removed, an exclusion zone will be established according to the project Health and Safety Plan, and the drill rig will be set up. The boring will be advanced to the depth indicated and sampled according to the FSP.

~~For borings where environmental samples will be obtained in the bedrock, surface casing may be required. If surface casing is required, it will be installed according to SOP GT.3, Isolating Bedrock From the Alluvium With Grouted Surface Casing. The bottom of the surface casing will be embedded in the bedrock according to SOP GT.3. The embedment may vary for monitoring wells according to the FSP or project specific work plan. After installing the casing, the bedrock will be drilled and sampled by using hollow-stem augers small enough to fit through the casing in boreholes designated for environmental sampling. In boreholes that are drilled only for geologic logging, hydraulic or geotechnical testing, or monitoring wells, the portion of the borehole below the casing may be drilled using conventional rotary or rock coring techniques (see SOP GT.4, Rotary Drilling and Rock Coring). This will normally allow for the use of a smaller diameter surface casing.~~

94-DMR-000995

It is anticipated that most or all of the weathered bedrock can be drilled and sampled by using the continuous hollow-stem auger coring method. However, if bedrock that is sufficiently cemented to render this method ineffective is encountered in borings designated for environmental sampling, the cemented zone will be rock cored using filtered air as the drilling medium according to SOP GT.4, Rotary Drilling and Rock Coring. If during geotechnical drilling, bedrock is encountered that is sufficiently cemented to be resistant to auger or drive sampler penetration and sufficient samples of the bedrock have been obtained, refusal will be declared and operations (abandonment of the hole or installation of monitoring devices in the hole) will proceed when total depth has been reached. After the cemented zone is penetrated, the boring will continue with hollow-stem auger coring. If necessary, this may require reaming the cored section with air-rotary techniques.

94-DMR-000995

94-DMR-000995

The borings will be logged lithologically by examination and classification of the samples. Documentation will be completed by the site geologist according to Section 8.0 of this SOP. SOP GT.1, Logging Alluvial and Bedrock Material, describes procedures for material classification and borehole logging during environmental sampling. Material classification and borehole logging during geotechnical drilling will conform with generally accepted geotechnical practice (ASTM visual soil classification techniques).

94-DMR-000995

At the first indication of free water on the sampler or in samples, the time and estimated depth will be recorded. However, it is frequently difficult to determine the true water level in hollow-stem auger borings at the time of drilling, particularly when drilling in low-permeability soil or bedrock. Therefore, water levels will ~~also~~ be measured each day ~~before~~ at the beginning of drilling ~~begins~~ and recorded on ~~Form GT.2A~~ the appropriate forms. In low-permeability deposits, it is possible for a borehole to be drilled below the groundwater level and not collect water for several hours or even days. It is, therefore, important to note moisture changes in the samples when evaluating groundwater conditions at the time of drilling. ~~During the drilling and while the augers are being removed, the cuttings and unsaved portions of samples from the boring will be containerized according to SOP FO.8, Handling of Drilling Fluids and Cuttings, and SOP FO.9, Handling of Residual Samples.~~ During drilling and removal of augers, the disposition of soil cuttings will be determined in accordance with SOP FO.23, "Management of Soil and Sediment Investigation Derived Materials (IDM).

94-DMR-000995

5.3 SAMPLING PROCEDURES

94-DMR-000995

~~5.3.1 Continuous Core Auger Sampling~~

~~The continuous coring method advances a split barrel that is contained within the lead auger. The augers rotate around the sampler and cut while the sample barrel is prevented from rotating. Continuous core samples are collected in the barrel. The barrel will be unlined except for a 3-inch long stainless steel VOA sample liner placed at the bottom end of the barrel directly behind~~

~~the cutting shoe. Once the core barrel has been removed from the borehole, opened, scanned, and measured, the VOA sample liner will immediately be capped with Teflon® lined plastic caps paper, sealed with electrical tape, plastic caps, labeled, and placed plastic bags prior to placement in a cooler with ice. In order to obtain a composite sample for additional analyses, including semi-VOAs, the sampler will be closed and placed in a safe location, out of the direct sun, until a sufficient interval of samples have been obtained. Once the samples have been obtained, the core barrels will be opened and each sample will then be classified, logged, peeled, composited, and placed in appropriate containers for analytical testing according to SOP FO.13, Containerization, Preserving, Handling, and Shipping of Soil and Water Samples. Sample intervals and requirements for compositing will be defined in the FSP or project specific work plan.~~

~~Sample peeling will involve discarding the portion of sample that was in direct contact with the sampler. Once the samples have been peeled, a linear scraping of the peeled samples will be placed in a stainless steel bowl and mixed with a stainless steel instrument. Soil particles (gravels) larger than the jar mouth will be discarded. Peeling and compositing will be conducted with separate decontaminated stainless steel instruments. If the core is not coherent, core samples need not be peeled before sampling because it is difficult to be certain what parts of a noncoherent sample were in contact with the sampler.~~

~~Samples for geotechnical testing will consist of approximately 3/4 filled pint-sized glass jars with air-tight lids placed in compartmented shipping cartons designed to prevent breakage of the jars. Sample peeling is not required for geotechnical samples.~~

5.3.1 Drive Sampling

Drive samples will be obtained in general accordance with ASTM Designation D 1586. After drilling to the predetermined depth, the standard split spoon or California sampler will be attached to the end of the drill rod and lowered to the bottom of the boring. The standard 140-pound

94-DMR-000995

94-DMR-000995

hammer assembly will then be attached to the top of the drill rod. The depth to the bottom of the sampler will be recorded, and reference marks at 6-inch increments will be placed on the drill rod. The test consists of driving the sampler with the standard 140-pound hammer dropped 30 inches.

When using the 2-inch-outside-diameter (O.D.) standard split spoon sampler, drive the sampler through three 6-inch increments (or 100 blows, whichever occurs first), with the sum of the last two increments being the Standard Penetration Count or Blow Count or N-value, and the first 6-inch increment being considered as seating.

A California barrel with brass (or stainless steel) liners may be substituted for the standard split barrel. The integrity of the sample can generally be better maintained since thin-walled liners containing the sample can be removed from the barrel and sealed. Since the California sampler is shorter than the standard split spoon sampler, it will be driven only 12 inches, with blow counts recorded for each 6-inch increment. However, several blows are required before marking and counting blows to seat the sampler.

A California barrel has a 2.5-inch O.D. and a 2-inch inside diameter (I.D.) Modified California samplers with larger diameters are also available. The liners for a conventional California barrel have a 1.94-inch I.D. Although not precisely equivalent, the blow count obtained by using a 2-inch I.D. California barrel is frequently considered to be comparable to the N-value obtained using a standard barrel. Blow counts using larger samplers will not be equivalent, and larger hammers may be required to drive them under some conditions.

A rope and cathead arrangement or automatic trip hammer will be used to obtain drive samples. If a rope and cathead arrangement is used, excessive turns of the rope on the cathead must be avoided, since this will result in friction and drag between the rope and cathead. Two turns of the rope on the cathead will be used and sufficient slack in the rope provided during hammer free fall to prevent excessive friction.

Standard split spoon samples saved for geotechnical testing will consist of 3/4-filled pint-sized glass jars with airtight lids placed in compartmented shipping cartons designed to prevent breakage of the jars. Samples for VOA analytical testing will be obtained by placing a 3-inch long stainless steel VOA sample liner at the bottom end of the barrel directly behind the cutting shoe. Composite samples for additional analyses, including semi-VOAs, will consist of linear scrapes from three consecutive peeled samples (see Subsection 5.3.1) placed in containers described in SOP FO.13, Containerization, Preserving, Handling, and Shipping of Soil and Water Samples. For California liner samples, the geotechnical samples may be saved in the liners with plastic end caps.

~~5.3.3 VOC Sampling~~

DCN93.04

94-DMR-000995

DCN93.01

- ~~Three VOC samples will be taken per borehole. VOC sampling will be conducted in accordance with the project specific work plan. Additional VOC samples will not be taken for elevated OVA readings.~~

- ~~VOC samples will be collected from the base of every other 2-foot drive sample from the ground surface to the water table.~~

- ~~A VOC sample will be collected in the bottom of the first drive sample below the water table.~~

- ~~A final VOC sample will be collected from the base of the first drive within bedrock immediately below the alluvial material in unsaturated conditions.~~

- ~~Additional VOC samples will be collected as follows:~~

94-DMR-000985

~~If a lithologic feature or OVA reading indicates the possibility that VOC contamination exists, then a sample will be taken at the base of the next drive interval.~~

~~If the sampler is opened, scanned and a color change, free product, or other physical evidence indicating the possibility for contamination is observed in a location other than where a pretargeted VOC sample is located, a 3" section will be immediately cut, pulled, wrapped, placed in a wide mouth jar and sealed. The sample will be sent to the lab for subcoring and analysis.~~

5.3.2 Drum Characterization

When obtaining geotechnical samples strictly for the purpose of characterizing the environmental materials present in drums, the following procedures will apply.

During drilling operations, environmental materials accumulate in a mud pit and are then shoveled into drums. As drums are being filled, samples will be collected from the material filling the bottom, middle, and upper portion of the drum. The samples will be composited in a stainless steel bowl kept in a safe location out of the sun. The materials from up to four drums from a given borehole will be composited in this manner. The samples will then be placed in the appropriate containers for analytical testing.

DCN 92.03

When obtaining geochemical samples from drummed mixtures of bedrock and water resulting from drilling operations, a bailer will be used to obtain a sample from the bottom, middle, and upper portion of a drum. Materials from up to four drums from a given borehole will be composited in this manner. The samples will then be placed in the appropriate containers for analytical testing. (NOTE: In areas outside of IHSSs, no further characterization sampling will be done then is stipulated in the Work Field Sampling Plan.)

DCN 93.02

During drilling of boreholes, if a recent borehole (within one year) that has been sampled is located within 10 feet of the present borehole, no additional samples for drum characterization purposes only will be collected. All cored material will be saved in case it is needed for future analyses.

5.3.3 Kansas Type Sampler

This section contains procedures for collecting soil samples from depth without a drill rig utilizing a Kansas type sampler.

The equipment and supplies that are required are as follows:

- All Terrain Vehicle (Scorpion) with a Stanley sinker drill attached to the rear of the vehicle that is hydraulically powered from the systems mounted power take off or similar rig;
- Probe rods;
- One or two foot Kansas type sampler constructed of stainless steel with high strength alloy piston and screw-on top and bottom and reverse thread release pin;
- Extender rods, used for releasing piston stop pin on the sampler; and
- Appropriate sample liners or containers.

DCN 93.03

The following steps are required to obtain soil samples.

1. Assemble sampler with appropriate liners, if necessary.

2. Attach probe rods to sampler and hydraulically push and hammer sampler to the top of the desired sampling depth. If depth to first sample interval or depth between samples is more than about two feet, a pilot hole may be driven to the top of the desired sampling depth.

3. Insert extruder rods down the inside of the probe rods and thread it into the piston stop pin.

4. The piston stop pin is made up of two different types of threads. One being right hand thread and the other being a left thread. With this type of thread pattern the result will be that the extruder rods will thread into the piston stop pin. After the extruder rods have snugged up into the piston stop pin, the piston stop pin will then unscrew from the sampler. Once the piston stop pin has been unscrewed from the sampler, it along with the extruder rods will be withdrawn from the probe rods.

5. The sampler will then be pushed and hammered one or two feet depending upon the length of the sampler.

6. The sampler and probe rods are then withdrawn from the hole.

7. The sampler is then taken apart and the sample removed.

8. The sample will then be screened as specified in the Field Sampling Plan and logged. Note: typically, all the soil removed is sent to the laboratories; therefore, core cannot be logged at a later time and saved for a permanent record as discussed in GT.1 Logging Alluvial and Bedrock Material.

DCN 93.03

DCN 93.03

9. Samples saved for geotechnical testing will consist of 3/4-filled pint-sized glass jars with airtight lids or capped liners. Samples for VOC testing will be saved in capped liners. Samples for additional analyses, will be saved in either the containers described in SOP FO.13, Containerization, Preserving, Handling, and Shipping of Soil and Water Sampler or capped liners.

94-DMR-00095

5.4 BORING COMPLETION AND ABANDONMENT

After the borehole has been advanced to its final depth, it will either be abandoned or completed as a monitoring well, piezometer, or inclinometer (see SOP GT.5, Plugging and Abandonment of Boreholes, and SOP GT.6, Monitoring Wells and Piezometer Installation).

The boring location stake will be left in the ground adjacent to the borehole, and a board or other cover placed over the hole until it has been grouted. All boreholes to be abandoned with a depth greater than 1 foot will be grouted the same day that abandonment is completed. The boring location stake will then be placed in the grout.

6.0 QUALITY ASSURANCE/QUALITY CONTROL OF SOIL SAMPLES

Soil samples will be obtained in accordance with generally accepted geotechnical practice and applicable ASTM standards.

~~Quality Assurance (QA) and Quality Control (QC) activities will be accomplished according to applicable project plans as well as quality requirements presented in this SOP.~~

~~QA samples for soils fall into five categories:~~

- ~~Duplicate~~
- ~~Matrix spike~~
- ~~Matrix spike duplicate~~
- ~~Equipment rinsate~~
- ~~Field blank~~

~~SOP FO.13, Containerization, Preserving, Handling, and Shipping of Soil and Water Samples describes the general handling of samples. Applicable project plans specify QA sample frequencies. If insufficient sample material is available for the collection of a planned QC sample, the conditions that prevent the collection of the QC sample will be documented in the field log book and on the Daily Field Drilling Activities Report Form (GT.2A). The Project Manager will be informed that QC samples were not collected as planned so that any impacts to the QA/QC goals established in applicable project plans can be evaluated.~~

94-DMR-000995

94-DNR-000995

~~If sufficient material is available to collect a planned QC sample, the QC sample will be collected and documentation will be recorded in the field log book and on the Daily Field Drilling Activities Report Form (GT.2A). Sample collection procedures will be the same as those described in Section 5.0 for duplicate, matrix spike, and duplicate matrix spike samples. These samples are intended to be as close to exact replicates of the original samples as possible. They are obtained immediately adjacent to the planned samples that they are intended to duplicate. The hollow stem auger barrel should be designed with ridges to incorporate two 3 inch stainless steel sample liners above the barrel shoe. This design will be used to collect a VOA soil sample and its replicate. Project or site specific QC sample collection techniques will be addressed in either the field sampling plan, work plan, or Quality Assurance Addendum.~~

~~A rinsate sample from sampling equipment is intended to check for potential contamination of the sample by the sampling equipment. For the soil sampling operation, a rinsate sample will be~~

94-DMR-000995

~~collected from sampling equipment with any liners in place before the sampling equipment is used. Approximately 3 liters of distilled water will be rinsed over a decontaminated sampler and collected in a large decontaminated stainless steel bowl. A decontaminated glass or stainless steel beaker will be used to dip the water from the bowl and fill the sample bottles. The rinsate samples will be analyzed for the same parameters as the soil samples.~~

~~Field blank samples are containers filled with clean water that are handled and moved the same as the other samples to check for potential cross-contamination resulting from field handling and movement procedures.~~

7.0 DECONTAMINATION

Generalized equipment decontamination procedures will include:

94-DMR-000995

- ~~Sampling equipment. Decontamination will be conducted between individual sampling points to minimize potential cross-contamination. Sampling equipment will be decontaminated according to SOP FO.3, General Equipment Decontamination. During drilling and sampling, decontaminated equipment will be placed on new plastic or racks until it is used. At least two sets of samplers will be available so that one set can be used while the other is being decontaminated.~~

- Drilling equipment. ~~Decontamination of augers, drill stems, drill bits, and other down-hole equipment will be conducted after each boring is complete.~~ Drill rigs will be decontaminated when moved out of a work area or when they become unusually dirty as a result of site or drilling conditions, at the discretion of the site or project manager. Decontamination of drilling equipment is described in more detail in SOP FO.4, Heavy Equipment Decontamination.

94-DMR-000995 - 94-DMR - 000995

93-DMR-000955 - 93-DMR-000955

- Downhole equipment. Upon completion of drilling in a work area (for this project, a dam site), all downhole equipment will be decontaminated in accordance with SOP FO.04, Heavy Equipment Decontamination.

8.0 DOCUMENTATION

All information required by this SOP will be documented on ~~the Borehole Log Form (Form GT.1A)~~ job-specific log forms and the Hollow-Stem Auger Drilling Daily Field Drilling Activities Report Form (Form GT.2A). The Daily Field Drilling Activities Report Form will be filled out for each day of drilling at a given borehole location and, in situations where more than one boring is drilled and completed per day per drill rig, at least one form will be completed per boring. The borehole log will include information on subsurface material classification ~~and lithology~~. The Daily Field Drilling Activities Report will include the following information and have space for comments and documentation of general observations:

93-DMR-000955

- Project name ~~and bore identification~~
- Subcontractors
- Location code
- Date
- Weather conditions
- Drilling company and driller
- Geologist and other crew members
- Equipment descriptions (rig, augers, bits, etc.)
- Borehole depth ~~and diameter~~
- ~~Water level~~
- Sample number
- ~~Depth to bedrock~~
- QC Code

94-DMR-00095

- ~~Decontamination~~
- Time
- ~~Samples and depths~~
- OVM and RAD readings
- End-of-day status (in progress of drilling completed)
- Chronological record of activities

93-DMR-00955

The above information shall be entered into the field data capture program (Datacap) (see procedure FO.14, Field Data management).